2008 WMA Mini-Grant Research Project Proposal

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This project is in affiliation with what WMA group or groups? Tehama, Glenn, Colusa WMA

List what other Noxious and Invasive Weed Research has been conducted by you or your group: Yellow Starthistle, Medusahead,

Proposed Project(s)

Project Title: Fertilization to Reduce Rangeland Weeds

Project Goal (1/2 page max):

Infestations of *Centaurea solstitialis* (yellow starthistle, YST) and *Taeniatherum caput-medusae L*. (Medusahead, Mh) occur throughout the State, challenging land managers to manage these noxious weeds. Large infestations can be controlled easily through herbicide application or controlled burns. However, low to moderate infestation levels, around 35% or less, create another challenge. In these situations, the cost of chemical treatment is prohibitive. However, such low levels of infestation can repopulation the seedbank and lead to more serious problems in subsequent years. Consequently, growers require an option that provides economical return on their investment, yet gives suppression of YST and Mh.

The timely application of fertilizers when desirable plants, particularly annual grasses, are establishing, but prior to the development of YST and Mh, may have the effect of increasing high quality forage and suppressing YST and Mh. We hypothesize that providing nutrients typically limited in the environment, such as nitrogen, will allow the grasses to out-compete the later germinating and establishing YST and Mh. Preliminary data in Colusa County has been encouraging, with good germination of grasses along the established transects to date leading us to believe that this approach has merit.

Controlling YST and Mh at low to moderate infestation levels can prevent the more management intensive controls such as large scale herbicide applications or controlled burns, thus also having water quality benefits. This rangeland fertilization project provides a different strategy for land managers to consider, and therefore the site will become on-farm demonstrations. Results will also be disseminated through UCCE channels, local Extension meetings and field days, newsletters, popular press as well as peer reviewed publications. It should be noted that both the Northern San Joaquin WMA and the Tehama, Glenn, Colusa WMA are submitting applications for the same project. The intent is duplicate the project in two different locations in the State to allow for variance found in the Sacramento and San Joaquin Valleys and therefore strengthen the validity of the recommendation of using fertilizer to control invasive weeds.

What are the project's long-term benefits and/or local, regional or statewide significance (8 sentence Max):

Providing ranchers with a viable option to control invasive weeds before infestation levels require more extensive inputs that are not practical is crucial for rangeland health. With rising costs of

inputs, herbicide application is not always economically viable. Cost of fertilizer has also increased, however the benefit can be realized from the increased desirable forage production resulting in increased pounds weaned. This incentive may be all that is needed to encourage ranchers to eradicate YST and Mh before the weeds establish a dominant foot hold on California rangelands.

Priority Topic Area Being Addressed (from request for proposal announcement, 8 sentence Max):

This project targets the little or no management research conducted to date priority area. Research on the use of fertilizer on rangelands for added forage production and weight gains has been extensively conducted. It is known that nitrogen fertilization provides added fall growth. However, the possible benefit of influencing species composition toward desirable species on annual rangelands is a very new concept. The multitudes of range reports and published material on rangeland fertilization have no mention of soil nutrition's effect on rangeland species composition. This new work would test whether the added spring or fall growth helped desirable annual plants and native perennials to out-compete populations of Mh and YST, rather than simply determining if more forage or weight gain was produced.

Please Describe your in-kind contributions toward research project(s) (4 sentence max):

Our cooperators are allowing us to utilize part of their operations, forgoing grazing for the duration of the project, and therefore taking a loss on potential profits. To calculate this cost, the going rental rate for rangelands in the area is used. Wilbur-Ellis John Taylor Division will donate nitrogen fertilizer. In addition, partial salaries from the local UCCE Program Representative and Field Assistant are also used as in-kind contributions.

Project Objectives, Tasks and Methods:

OVERALL OBJECTIVE (4 sentence Max):

Objectives will be to determine if fertilizing rangelands with low to moderate levels of YST and/or Mh can be effective in controlling these invasive weeds and economically viable for ranchers. The hope is that such a practice can increase forage, yet reduce or possibly eliminate YST and Mh in these situations.

Task 1 (2 sentence Max):

Fertilize plots with nitrogen-based fertilizer in the fall of the year in a location with YST and Mh with no more than 35% infestation levels.

Methods (8 sentence Max)-

A site will be selected with a low to moderate level of YST and/or Mh infestation, 35% or less. The site will be fenced off from livestock grazing during the project. Plots will be established in a randomized complete block for each treatment (3-4 replications per treatment). Treatments will include application of nitrogen based fertilizer (27-0-0) at low and medium rates, and a control of no fertilizer. Sites will be evaluated prior to fertilizer application (November) to document plant species composition and cover, again at mid-season (roughly March), and also at the end of the season (June).

Performance Measures:

How will you assess and/or analyze your results (8 sentence Max)?

Detailed plant species composition, percent bare ground, plant height, and forage production in pounds per acre will be analyzed for significant differences between the treatments and control. Thus, if YST and Mh levels are decreased, it will be possible to know what took their place. Project design will use a randomized complete block to account for differences in terrain and allow for repetition of treatments. Conclusions of success will only be drawn if statistically significant differences are seen between the treatment and controls. Once the levels of success are statistically proven, economic analysis can determine if the outcome is an economically viable option for weed control.

How will your results be disseminated (4 sentence Max)?

First, the project site will become an on-farm demonstration. In addition, results will also be disseminated through UCCE channels, local Extension meetings and field days, newsletters, popular press as well as peer reviewed publications. UCCE has a long standing tradition of extending research and making available new management practices for rangeland owners to implement.